

DECLARATION OF REED ZARS

UPHE v. Diesel Power Gear et al., 2:17-cv-00032-RJS-DBP

I, Reed Zars, declare that the following statements are true and correct to the best of my knowledge.

1. I am the attorney of record for Plaintiff in the above-referenced action.
2. A true and accurate copy of the document, "Summary of the Particulate Matter Testing done by the Davis County Health Department in August 2013," as provided to me by the Davis County Health Department, is attached hereto.

Signed under the penalties of perjury,

Dated: September 26, 2017

s/ Reed Zars
Reed Zars



Summary of the Particulate Matter Testing done by the Davis County Health Department in August 2013.

The goal of this work was to determine if there was a correlation between opacity and fine Particulate Matter with sizes of 2.5 microns and smaller (PM-2.5) during testing of diesel engines at Davis County.

The size of particles is directly linked to their potential for causing health problems. Particles that are between 10 micrometers (microns) in diameter and 2.5 microns are referred to as PM-10 and are considered to be "inhalable coarse particles". Particles that are 2.5 microns and smaller are grouped together as PM-2.5. PM-2.5 are considered "fine particles" and pose the greatest health problems due to their ability to get deep into the lungs, and possibly even into the bloodstream.

Among many of the observations and conclusions made during the study, the following were apparent:

- Opacity does help identify "dirty" vehicles,
- The majority of the PM measured was PM-2.5 not PM-10,
- The greatest number of particles in diesel exhaust are smaller than 0.5 microns,
- Particles less than 1.0 micron mirror opacity readings to the greatest extent,
- High opacity readings accurately represented high PM emissions.

Based on averaged peak concentration values measured during test runs 6 – 9, and 11 – 15, a vehicle that fails the Davis County Diesel Opacity inspection will have:

- More than twice the concentration of very small particulates (< 0.5 microns)
 - Average passing vehicle: peak concentration of 1.3M particles
 - Average failing vehicle peak concentration of 2.8M particles
- More than 17 times the concentration of particles between 0.5 and 1.0 microns
 - Average passing vehicle: peak concentration of 57,000 particles
 - Average failing vehicle peak concentration of 1,000,000 particles
- More than 100 times the concentration of particles between 1.0 and 2.0 microns
 - Average passing vehicle: peak concentration of 2,300 particles
 - Average failing vehicle peak concentration of 248,000 particles

Based on averaged mass values measured during test runs 6 – 9, and 11 – 15, a vehicle that fails the Davis County Diesel Opacity inspection will have:

- More than 4 times the weight of PM-2.5 (measured in micrograms per cubic meter – $\mu\text{g}/\text{m}^3$)
 - Average passing vehicle: average weight of $39 \mu\text{g}/\text{m}^3$
 - Average failing vehicle: average weight of $173 \mu\text{g}/\text{m}^3$
 - Average passing vehicle: peak weight of $214 \mu\text{g}/\text{m}^3$
 - Average failing vehicle: peak weight of $867 \mu\text{g}/\text{m}^3$